EPA Tools and Resources webinar

Public Health Impact of Wildfire Emissions:

Update on the Wildfire Smoke Guide, Public Health Information and Communications Research

Wayne Cascio, MD, FACC
Director, Environmental Public Health Division
National Health and Environmental Effects Research Laboratory
EPA's Office of Research and Development

June 21, 2017

Webinar Overview

Provide an update of:

- Wildfire smoke health facts relevant to public health
- 2017 Wildfire Smoke: Guide for Public Health Officials
- CME course “Air Particle Pollution and Your Patient’s Health”
- New EPA Wildland Fire Research website
- SmokeSense app
- Wildland Fire Sensor Challenge

Conflict of Interest Statement:

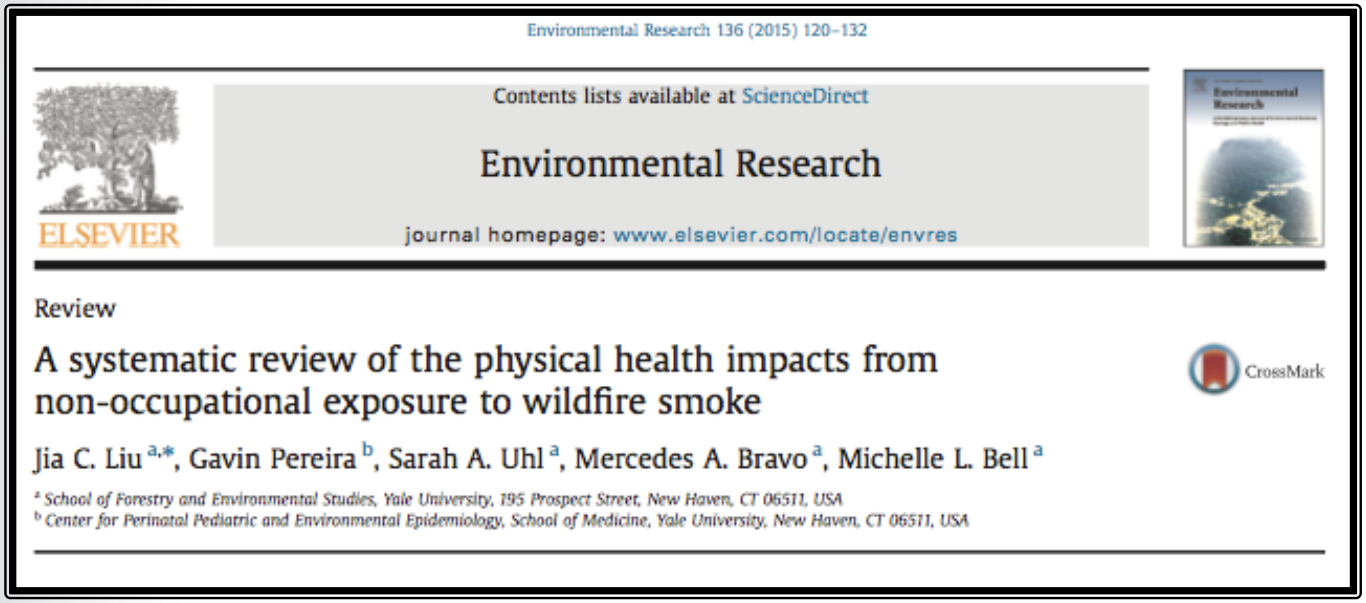
Wayne Cascio, MD, FACC

No conflicts of interest. The presentation represents the opinions of the speaker and does not necessarily represent the policies of the US EPA.

Wildfire Smoke and Health Effects

Health Effects of Wildfire Smoke

Systematic Reviews are Now Available



Environmental Research 136 (2015) 120–132

Contents lists available at ScienceDirect

Environmental Research

journal homepage: www.elsevier.com/locate/envres

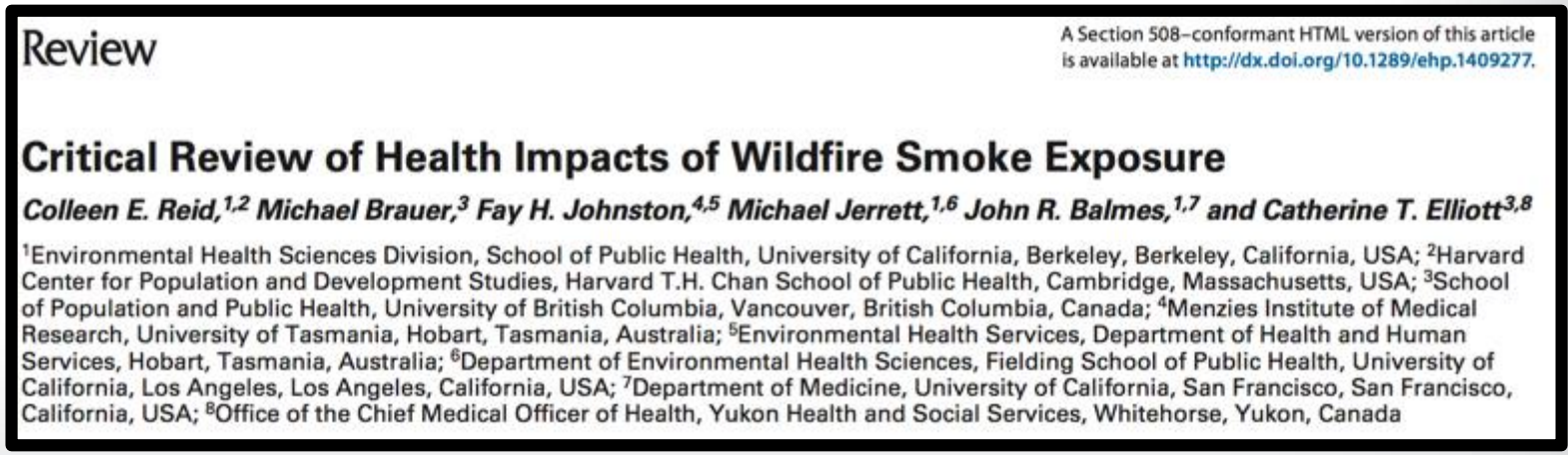
Review

A systematic review of the physical health impacts from non-occupational exposure to wildfire smoke

Jia C. Liu [a,*], Gavin Pereira [b], Sarah A. Uhl [a], Mercedes A. Bravo [a], Michelle L. Bell [a]

[a] School of Forestry and Environmental Studies, Yale University, 195 Prospect Street, New Haven, CT 06511, USA
[b] Center for Perinatal Pediatric and Environmental Epidemiology, School of Medicine, Yale University, New Haven, CT 06511, USA

Environ Res. 2015 Jan; 136:120-32. doi: 10.1016/j.envres.2014.10.015.



Environ Health Perspect. 2016; 124:1334–1343

Review

A Section 508–conformant HTML version of this article is available at http://dx.doi.org/10.1289/ehp.1409277.

Critical Review of Health Impacts of Wildfire Smoke Exposure

Colleen E. Reid,[1,2] Michael Brauer,[3] Fay H. Johnston,[4,5] Michael Jerrett,[1,6] John R. Balmes,[1,7] and Catherine T. Elliott[3,8]

[1]Environmental Health Sciences Division, School of Public Health, University of California, Berkeley, Berkeley, California, USA; [2]Harvard Center for Population and Development Studies, Harvard T.H. Chan School of Public Health, Cambridge, Massachusetts, USA; [3]School of Population and Public Health, University of British Columbia, Vancouver, British Columbia, Canada; [4]Menzies Institute of Medical Research, University of Tasmania, Hobart, Tasmania, Australia; [5]Environmental Health Services, Department of Health and Human Services, Hobart, Tasmania, Australia; [6]Department of Environmental Health Sciences, Fielding School of Public Health, University of California, Los Angeles, Los Angeles, California, USA; [7]Department of Medicine, University of California, San Francisco, San Francisco, California, USA; [8]Office of the Chief Medical Officer of Health, Yukon Health and Social Services, Whitehorse, Yukon, Canada

Health Effects of Wildfire Smoke

Health effects known or suspected to be caused by wildland fire smoke:

- All-cause mortality
- Asthma & chronic obstructive pulmonary disease (COPD) exacerbations
- Bronchitis & pneumonia
- Childhood respiratory disease
- Cardiovascular outcomes
- Adverse birth outcomes
- Symptoms such as eye irritation, sore throat, wheeze and cough

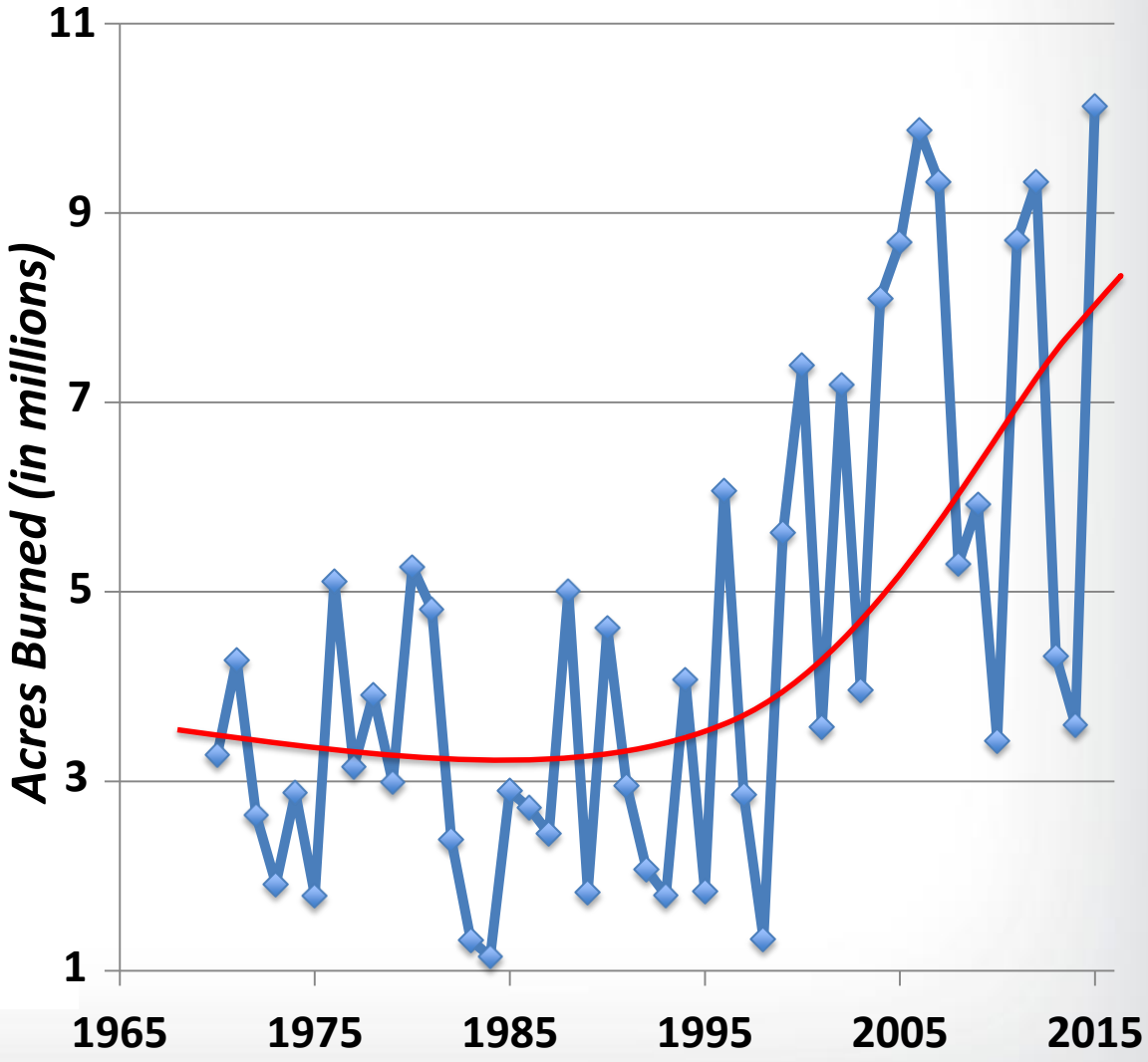
Source: Studies reviewed in Liu et al 2015

Wildfire in the U.S.

Acreage Burned in the U.S. Annually

Present Concerns

- ***Increasing acreage burned***
- ***Increasing impact on urban areas:***
  - 10% of all land with housing is situated in the wildland-urban interface (WUI)
  - 38.5% of U.S. housing units (Radeloff et al. 2005)
  - >4,000 acres/day converted to WUI
- ***Increased vulnerability of populations***



Adapted from https://www.nifc.gov/fireInfo/fireInfo_stats_totalFires.html

Wildland Fires & Their Emissions

A Community Public Health Issue

Brianna Paciorka
Knoxville News Sentinel

Wildfire spreads to Gatlinburg and Pigeon Forge

Large Wildland Fires are Costly

Estimating Health-Related Costs

Satellite image showing the location of Evans Road Fire in the Pocosin Lakes National Wildlife Refuge, NC

- ***Burned 40K acres of peat bogs***
- ***$20M in suppression efforts, 2 billion gallons of water, 202 days***
- ***Cost of excess ED visits for asthma and heart failure ~ $1 million***
- ***Additional estimates of health costs***
  - 4.4 premature deaths
  - 31 non-fatal heart attacks
  - 41 bronchitis & 810 asthma attacks
  - 530 lower respiratory symptoms
  - 769 upper respiratory symptoms
  - 3,700 work days lost
- ***Health & death-related costs $48.4 million***

Rappold A et al. Environ Sci & Tech 2014

Who's at Risk from Smoke?

Susceptible populations include –

- Pregnant women and fetuses
- Children
- Older populations
- Populations with pre-existing respiratory disease
- Populations with pre-existing cardiovascular disease

27% of U.S. population is at-risk

Populations suspected to be at greater risk –

- Populations with chronic inflammatory diseases (e.g., diabetes, obesity)
- Women, African-Americans and populations with lower socio-economic status*

* *Cocco Liu J et al. Am J Epidemiol 2017*

Changing U.S. Demographic Increases Wildfire Smoke Risk

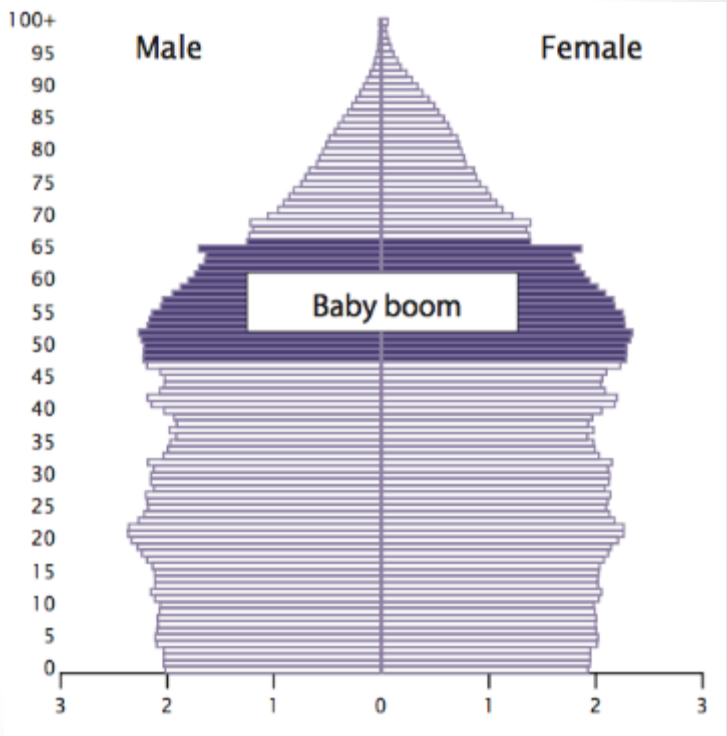
Changing U.S. Demographic

- U.S. population will continue to:
  - *Grow*
  - *Median age will shift upward*

Higher Prevalence of Chronic Diseases Conferring Risk to Wildland Fire Smoke

- Aging U.S. population with increasing prevalence of:
  - *Heart-lung disease, obesity, diabetes*

U.S. Population 2012



Xu J, Murphy SL, Kochanek DK, Arias E. NCHS Data Brief No. 267, 2016

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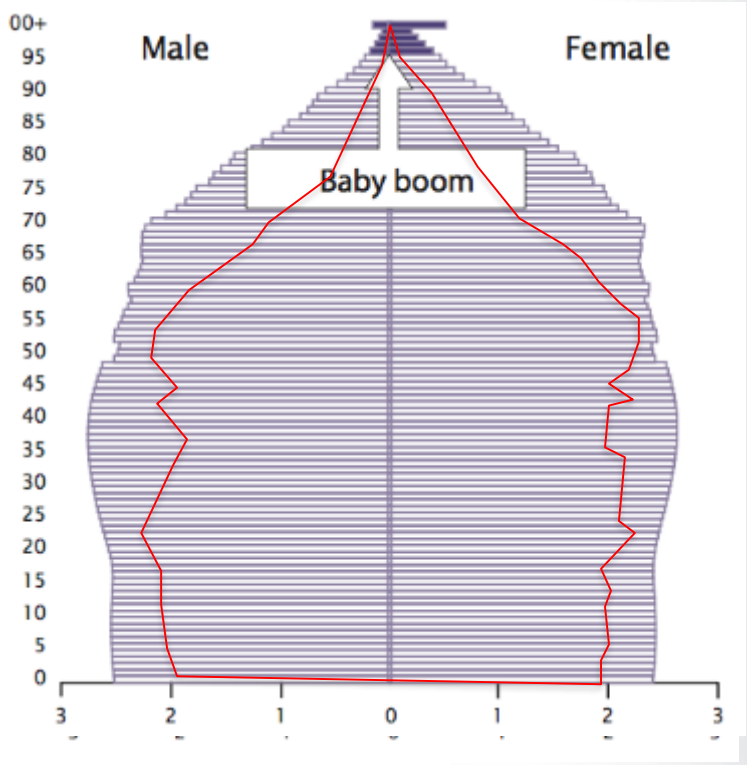
  - *Heart-lung disease, obesity, diabetes*

Projected U.S. Population 2060



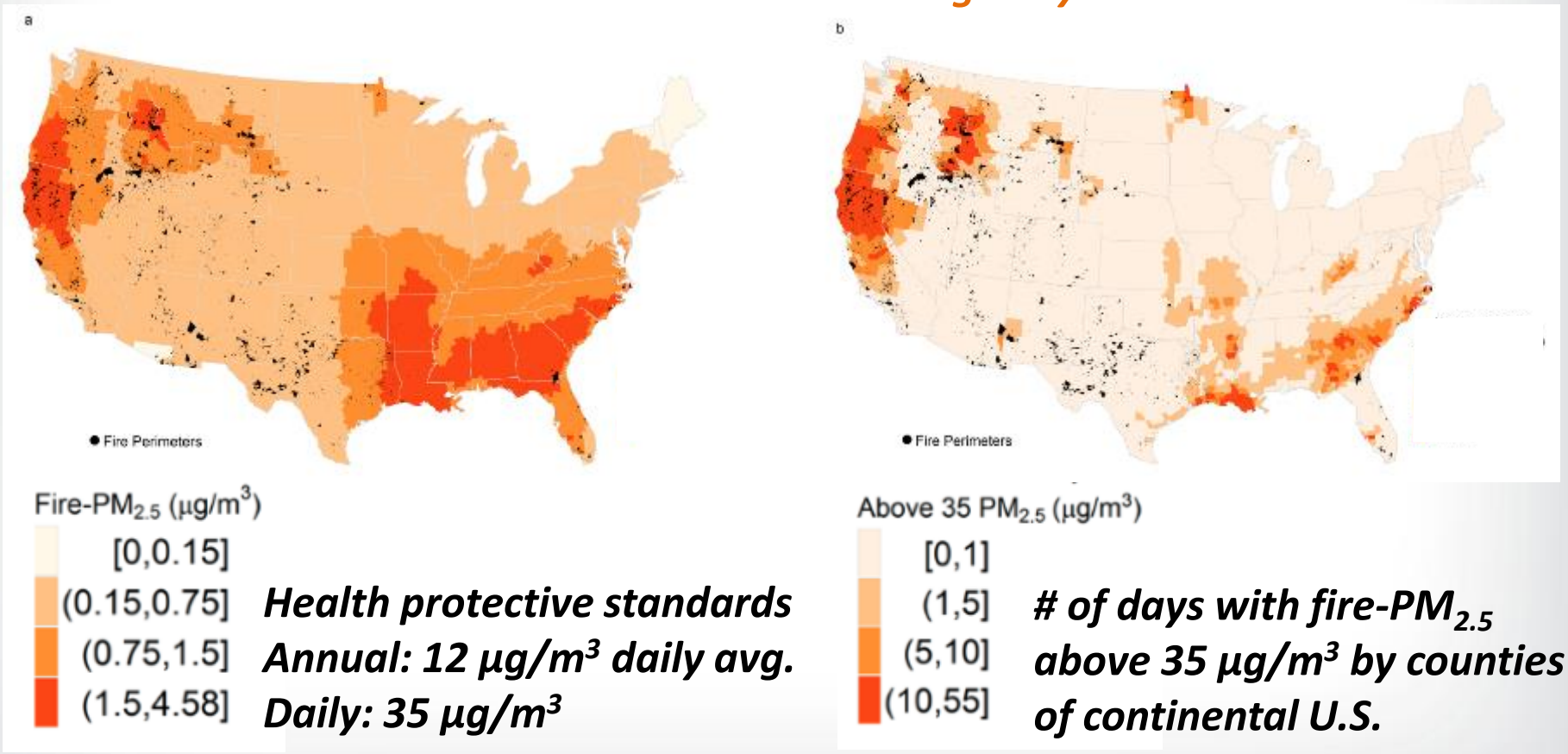
2012 U.S. Population – Red outline

Xu J, Murphy SL, Kochanek DK, Arias E. NCHS Data Brief No. 267, 2016

Air Quality Impacts of Wildland Fires

Annual average daily fire-$PM_{2.5}$ footprint for U.S. counties

How much does smoke contribute to air quality and how often does it lead to exceeding daily standard?



Health protective standards
Annual: 12 µg/m³ daily avg.
Daily: 35 µg/m³

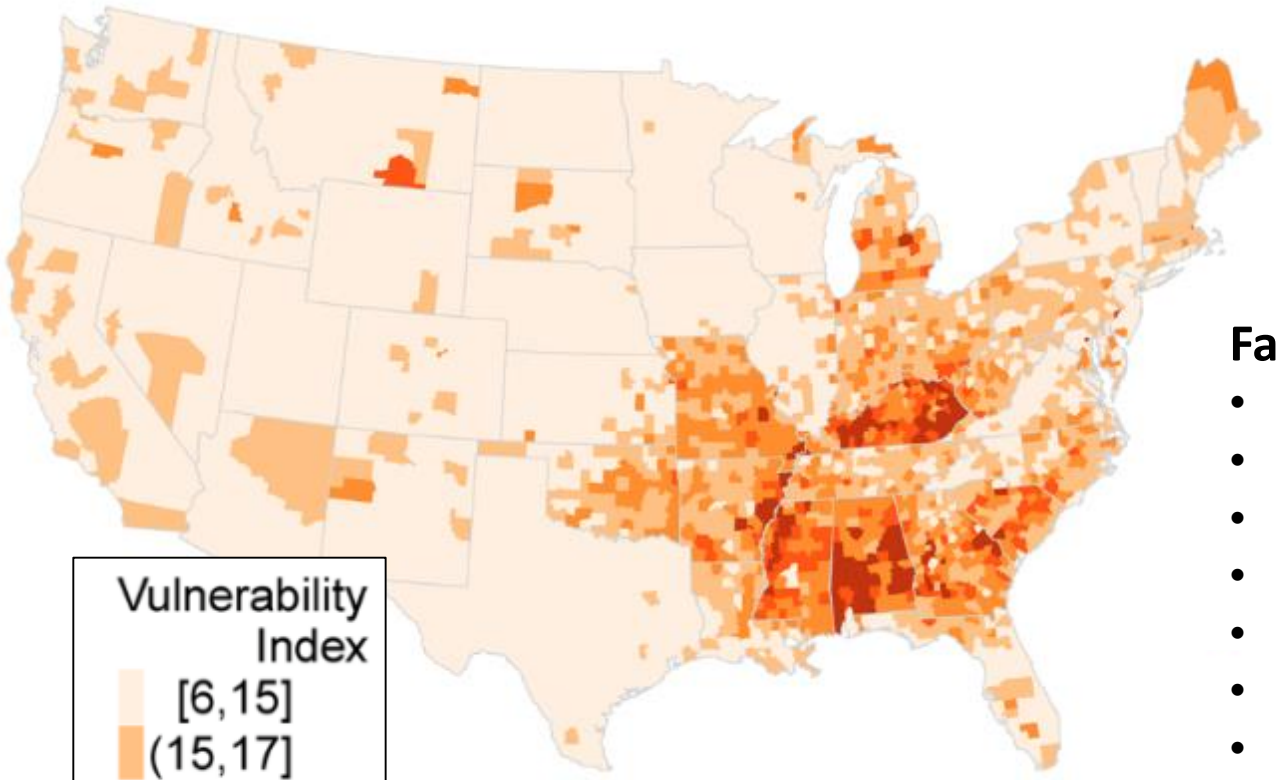
# of days with fire-$PM_{2.5}$ above 35 µg/m³ by counties of continental U.S.

Rappold AG, et al Environ Sci Technol 2017

Community Health-Vulnerability

Community-Health Vulnerability Index

National map of community-health vulnerability index and air pollution awareness to adverse health effects



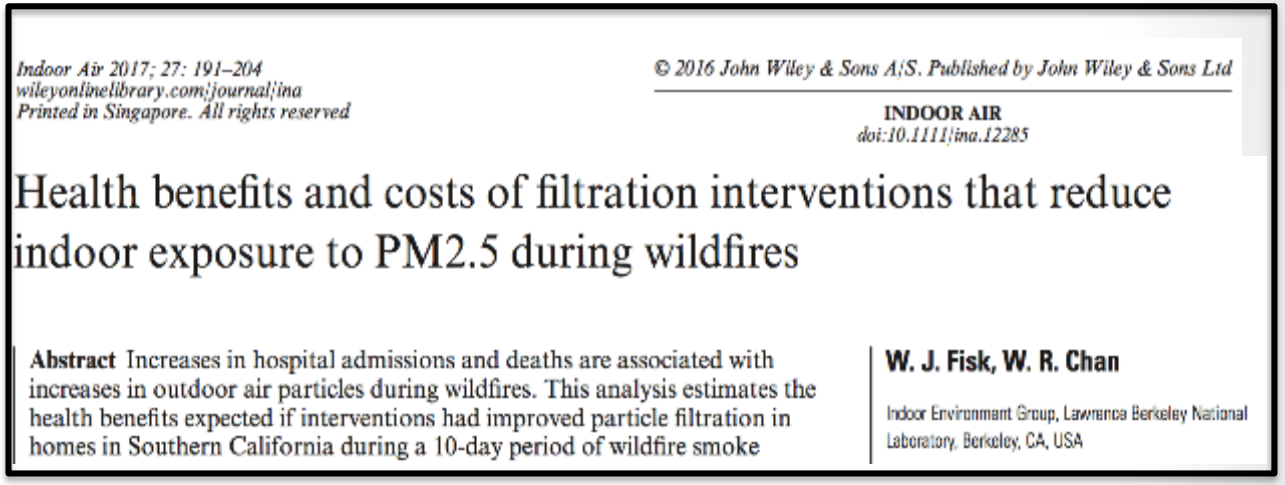
Factors of Vulnerability

- Peds & Adult Asthma
- COPD
- Obesity
- Diabetes
- Hypertension
- % population age 65+
- Income, education, poverty, unemployment

Rappold AG, et al Environ Sci Technol 2017

Health Benefits of Interventions
Particle Filtration in Southern CA Homes

- ***Fraction of the population with an admission attributable to wildfire smoke is small***



Indoor Air 2017; 27: 191–204
wileyonlinelibrary.com/journal/ina
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INDOOR AIR
doi:10.1111/ina.12285

Health benefits and costs of filtration interventions that reduce indoor exposure to PM2.5 during wildfires

Abstract Increases in hospital admissions and deaths are associated with increases in outdoor air particles during wildfires. This analysis estimates the health benefits expected if interventions had improved particle filtration in homes in Southern California during a 10-day period of wildfire smoke

W. J. Fisk, W. R. Chan

Indoor Environment Group, Lawrence Berkeley National Laboratory, Berkeley, CA, USA

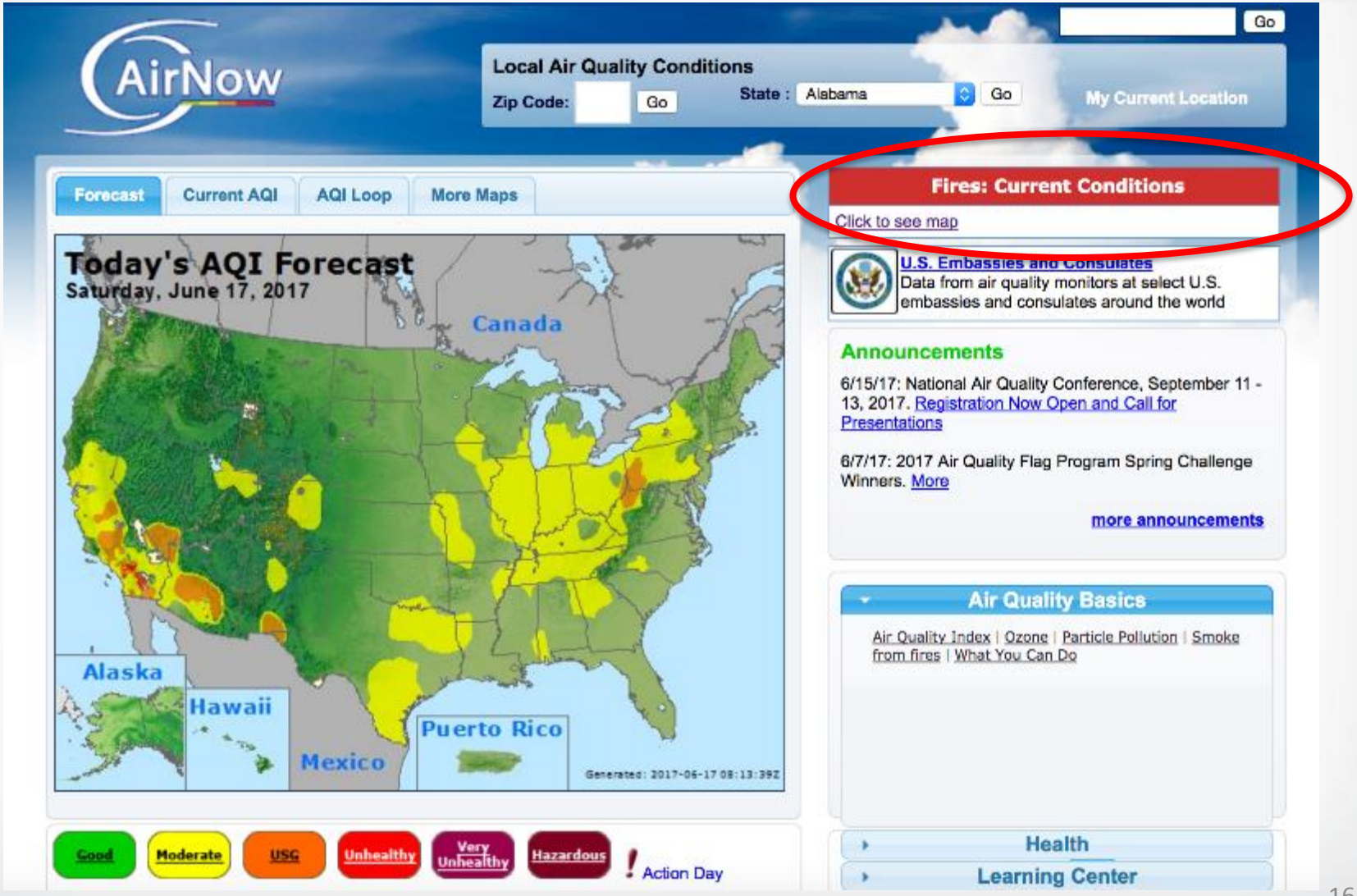
- Interventions projected to prevent 11% to 63% of the hospital admissions and 7% to 39% of the deaths attributable to wildfire particles
- Estimated economic value of the prevented deaths exceed or *far* exceed intervention costs for interventions that do not use portable air cleaners
- For portable air cleaner use, mortality-related economic benefits exceed intervention costs
- ***Cost effectiveness improved by intervening only in the homes of older people who experience most of the health effects of particles from wildfires***

Fisk WJ, Chan WR. Indoor Air 2017

AirNow.gov

Wildfire Smoke and Public Health Information

AirNow (www.AirNow.gov)

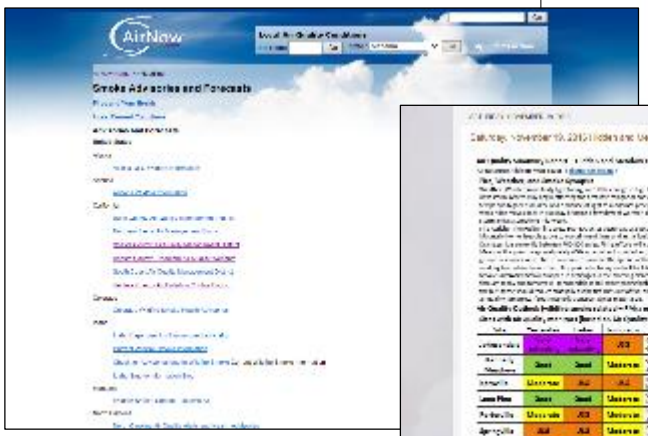


www.airnow.gov

Fires: Current Conditions Page

- Current Smoke Map generated by NOAA HMS
- Current Advisories – State/Local/Tribal agency blogs and Wildland Fire Air Quality Response Program

Current Conditions Map - May 9, 2016



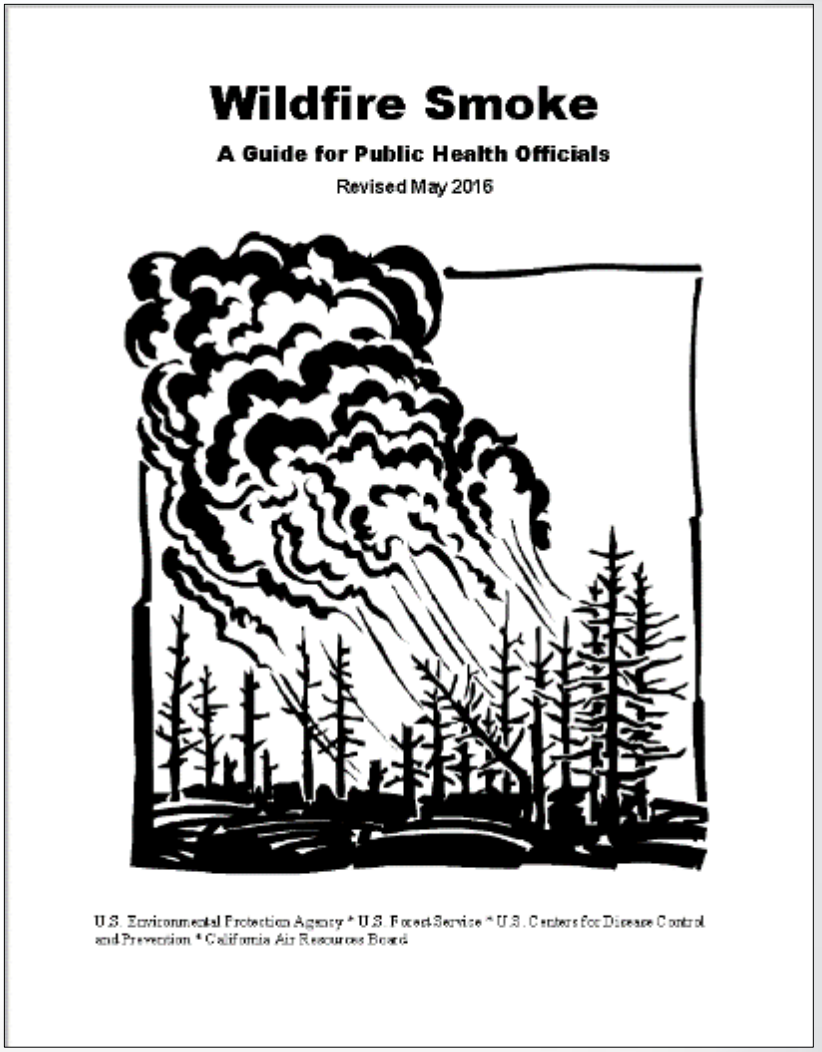
Current Advisories

CA Smoke Blog

USFS Wildland Fire Air Quality Response Program

Wildfire Smoke Guide 2016

- Primarily a federal/California document; housed on AirNow website
- Updated air quality and health information
- Evidenced-based exposure reduction measures
- Entirely new section on communicating air quality
  - Uses “Current Particulate Matter (PM)” levels from AirNow
  - Uses satellite information on Fires: Current Conditions page
  - Visual range information updated
- PEHSU fact sheets about children’s health, 2011
- Information about new interagency Wildland Fire Air Quality Response Program



https://www3.epa.gov/airnow/wildfire_may2016.pdf

New Wildfire Smoke Guide 2017

Coming in Late Summer/Fall

- **Updated look**
- **Addition of ozone**
- **Smoke vs. urban particles**
- **Add sections**
  - PM web course
  - Sensors
  - Ash clean-up
- **Stand-alone fact sheets**
  - Children
  - Older adults
  - Pets/livestock
  - Preseason preparedness
  - Exposure reduction
  - Respirator use
  - Ash clean-up
  - Know when to evacuate

Wildfire Smoke Guide 2017
Example Draft Fact Sheets

EPA

WILDFIRE SMOKE FACTSHEET

Prepare for Fire Season

If you live in an area that is regularly affected by smoke or where the wildfire risk is high, take steps to prepare for fire season. Know how to get ready before a wildfire. Know how to protect yourself from smoke exposure during a wildfire.

Being prepared for fire season is especially important for the health of children, older adults, and people with heart or lung disease.

Prepare Before a Wildfire

- **Stock up** so you don't have to go out when it's smoky. Have several days of medications on hand. Buy groceries that do not need to be refrigerated or cooked, because cooking can add to indoor particle levels.
- **Create a "clean room"** in your home. Choose a room with as few windows and doors as possible, such as a bedroom. Use a portable air cleaner and avoid indoor sources of pollution.
- **Buy a portable air cleaner** before there is a smoke event. High-efficiency particulate air (HEPA) filter air cleaners and electrostatic precipitators that do not produce ozone, can help reduce indoor particle levels.
- **Understand** how you will receive alerts and health warnings, including air quality reports and public service announcements, from local officials.
- **If you have heart or lung disease,** check with your doctor about what you should do during smoke events.
- **If you have asthma or another lung disease**, update your respiratory management plan.
- **Have a supply of N95 masks** and learn how to use them. They are sold at many home improvement stores and online.
- **Organize** your important items ahead of time and know where to go in case you have to evacuate.

EPA

WILDFIRE SMOKE FACTSHEET:
Indoor Air Filtration

Exposure to Particle Pollutants

Indoor sources of particulate matter (PM) come from combustion events such as smoking, candle burning, cooking and wood-burning. During a wildfire event, outdoor PM can increase indoor PM levels well above the levels normally found. As outlined in the Guide, reducing indoor sources of pollution is a major step to lower the concentrations of PM indoors. Further reductions in indoor PM can be achieved using one of the filtration options discussed below.

Filtration Options

There are two effective options for improving air filtration in the home: upgrading the central system filter, or using high efficiency portable air cleaning appliances. Before discussing filtration options, it is important to understand the basics of filter efficiency.

Filter Efficiency

The most common industry standard for filter efficiency is known as the Minimum Efficiency Reporting Value, or MERV rating. The MERV scale for residential filters ranges from 1-20. The higher the MERV rating the greater the percentage of particles captured as the air passes through the filter media. Higher MERV (higher efficiency) filters are especially effective at capturing very small particles that can most affect health.

Central Air System Filter

The filter used in the central heating/cooling system of the home can effectively reduce indoor PM. A home typically will have a low MERV (1-4) fiberglass filter that is 1" thick. Simply repla
filter with a medium efficiency filter (MERV
significantly improve the air quality in you
Higher efficiency filters (MERV 9-12) will
even better, and a true high efficiency filte
16) in the central system can reduce PM by
as a 95%. However, these filters can also
more resistance to air flow, which may incr
energy used by the blower motor for the
You may wish to consult with a local
technician or the manufacturer of your ce
system to confirm that the system can hand
efficiency filter. If you are not able to upgr
more efficient filter, simply running the
continuously by switching the thermost
"Auto" to "On" has been shown to red
concentrations by as much as 24%.

Portable Air Cleaners

Portable air cleaners are self-contained air
appliances that can be used alone or in con
enhanced central filtration to effectively
particles. Their effectiveness in reduc
depends on several factors such as the siz
air cleaner, the filter efficiency, how frequ
unit is turned on and at what fan speed. Por
cleaners fitted with high efficiency filters ca
indoor PM concentrations by as much as
more.

Portable Air Cleaners: How to Choose

There is a wide variety of air cleaners on the
ranging in price from about $50 to $3,000. H
air cleaners under about $200 typically do n
the air well and would not be helpful in a
situation.

Types of Air Cleaners

Most air cleaners fall under two basic cat
mechanical and electronic. Mechanical air

EPA United States Environmental Protection Agency

PEHSU Pediatric Environmental Health Specialty Units

WILDFIRE SMOKE FACTSHEET

Children

Background

- **Wildfires** expose children to fire, smoke, the byproducts of burning, and other chemicals released from burning structures and furnishings in addition to the psychological stress associated with these events.
- **During the acute phase** of wildfire activity, the major problems are fire and smoke. Smoke can travel many miles downwind from a burning fire.
- **Children**, individuals with pre-existing lung or cardiovascular diseases (e.g. asthma) are especially vulnerable during wildfires.
- **Children are in a critical period of development** when toxic exposures can have profound negative effects, and their exploratory behavior often places them in direct contact with materials that adults would avoid.

Health Effects from Smoke

- Wildfire smoke has very small particles, liquid droplets, and gases such as carbon monoxide (CO), carbon dioxide (CO2) and other volatile organic compounds (VOCs).
- Symptoms from smoke inhalation can include chest tightness, shortness of breath, wheezing, coughing, respiratory tract and eye irritation and burning, chest pain, dizziness, or lightheadedness and other symptoms.
- Children with allergies and asthma may have more symptoms than usual.
- The risk of developing cancer from short-term exposures to smoke is vanishingly small.

Recommendations

Planning Ahead

- **Stock up** so you don't have to go out when it's smoky. Have several days of medications on hand.
- **Buy groceries** that do not need to be refrigerated or cooked, because cooking can add to indoor particle levels.
- **Create a "clean room"** in your home. Choose a room with as few windows and doors as possible. Use a portable air cleaner and avoid indoor sources of pollution.
- **Buy a portable air cleaner** before there is a smoke event.
  - High efficiency particulate air (HEPA) filter air cleaners and electrostatic precipitators that do not produce ozone can help reduce indoor particle levels.
- **Organize** and plan ahead of time and know where to go in case you have to evacuate.

During Wildfires – Around Your Home & Car

- **Stay indoors** with the doors and windows closed. If you have an air conditioner, run it with the fresh-air intake closed (recirculate mode) to keep outdoor smoke from getting indoors.
- **Do not add to indoor air pollution.**

Wildfire Factsheets Under Development

Original PEHSU Wildfire Factsheet available at: http://www.pehsu.net/cgi/page.cgi/resources.html

Health Providers Page

Health Tools

Web Course Tour
Health Providers Page

Particle Pollution and Your Patients' Health

https://www.epa.gov/pm-and-your-patients-health/patient-education-tools

Applied for continuing education credit from CDC for physicians, nurses and health educators

What Is It? Who Is It For?

Particle Pollution and Your Patients' Health is a short, evidence-based training course that:

- Describes the biological mechanisms for cardiovascular and respiratory health effects with particle pollution exposure
- Helps health-care providers advise their patients about particle pollution exposure
- Provides practical education tools to help patients understand how particle pollution exposure can affect their health and how to use Air Quality Index to protect health

Particle Pollution and Your Patients' Health is designed for:

- Diverse range of physicians
- Nurses and nurse practitioners
- Public health officials/practitioners
- Asthma educators
- Other medical professionals who counsel patients about lung, heart or vascular disease

What is Particle Pollution?

Particle Pollution and Your Patients' Health

Contact Us Share

- Course Home
- About this course
- **What is Particle Pollution?**
- Particle Pollution Exposure
- Cardiovascular Effects
- Respiratory Effects
- Patient Exposure and the Air Quality Index
- Patient Exposure and High Particle Pollution Events
- Clinical Scenarios
- Frequent Questions
- Course Outline/Key Points
- Review Questions
- Patient Education Tools
- Course Evaluation
- References
- Glossary

What is Particle Pollution?

On this page:

- What is particle pollution and what types of particles are a health concern?
- Where does particle pollution come from?
- Where and when is particle pollution a problem?

What is particle pollution and what types of particles are a health concern?

Particle pollutio
and liquid drople
be made up of a
compounds (suc
chemicals, soot,
spores).

The air we breat
dust, dirt, soot, c
they can only be

Your patients wh
effects of particle
concerned about
micrometers (µn
because these ar
pass through the
lungs and might
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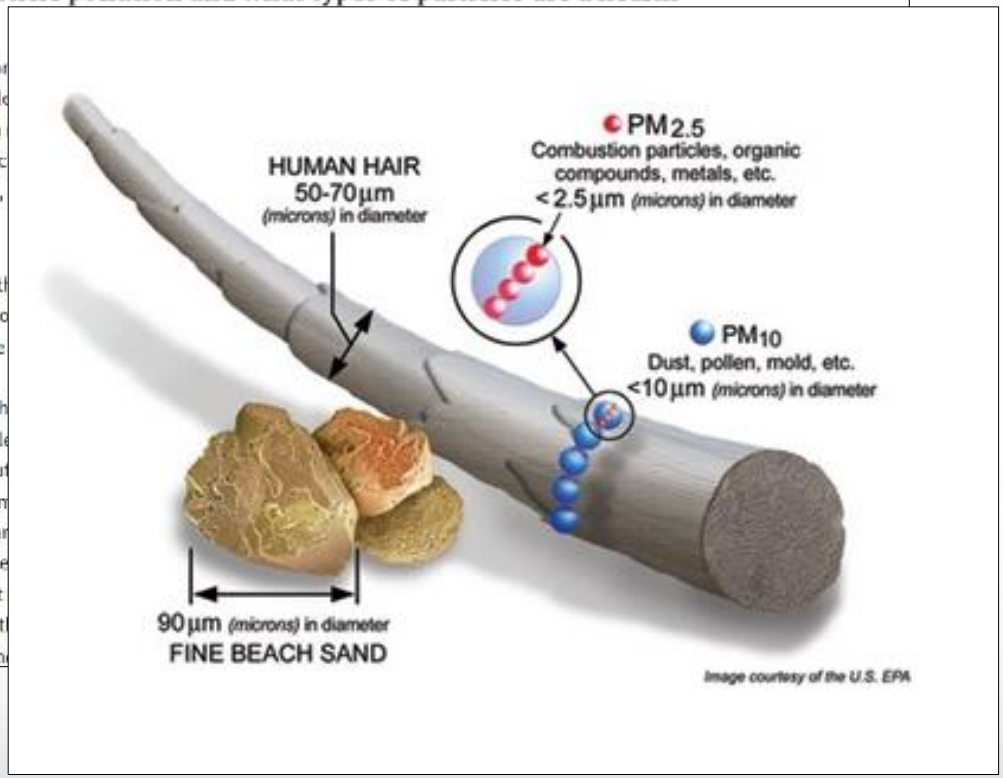
Once inhaled, th



https://airnow.gov/index.cfm?action=aqibasics.particle

Cardiovascular Effects

Why is particle pollution a cardiovascular health concern?

Cardiovascular disease accounts for the greatest number of deaths in the United States. One in three Americans has hear
in every three death
disease represent 1

Traditional risk fact
pressure, high chole
acting independent
cardiovascular dise
development of, ca
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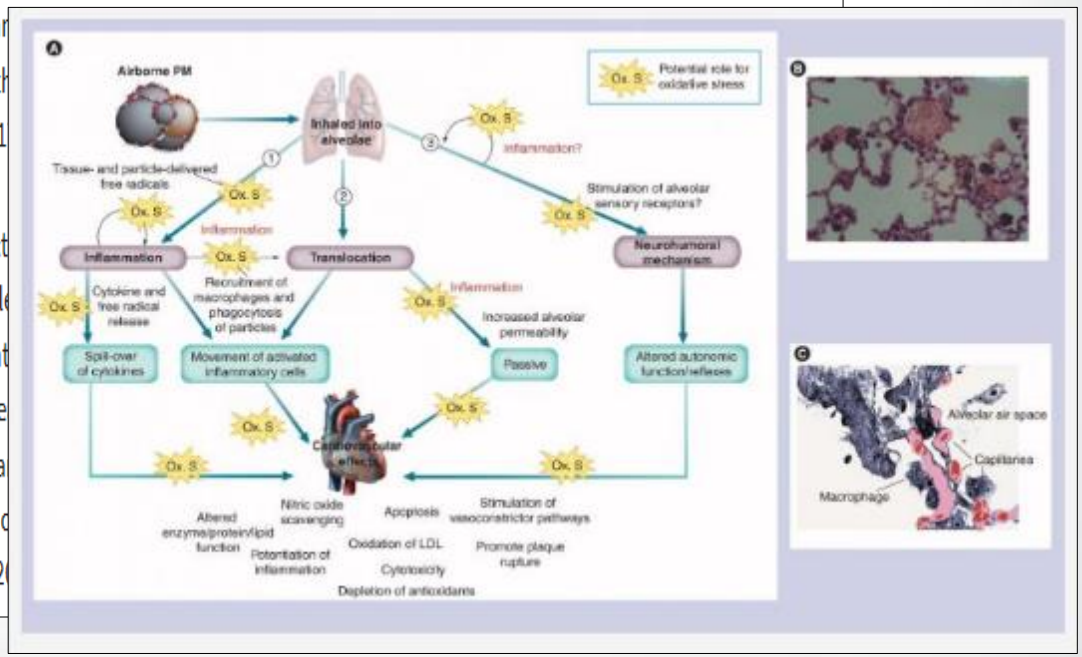
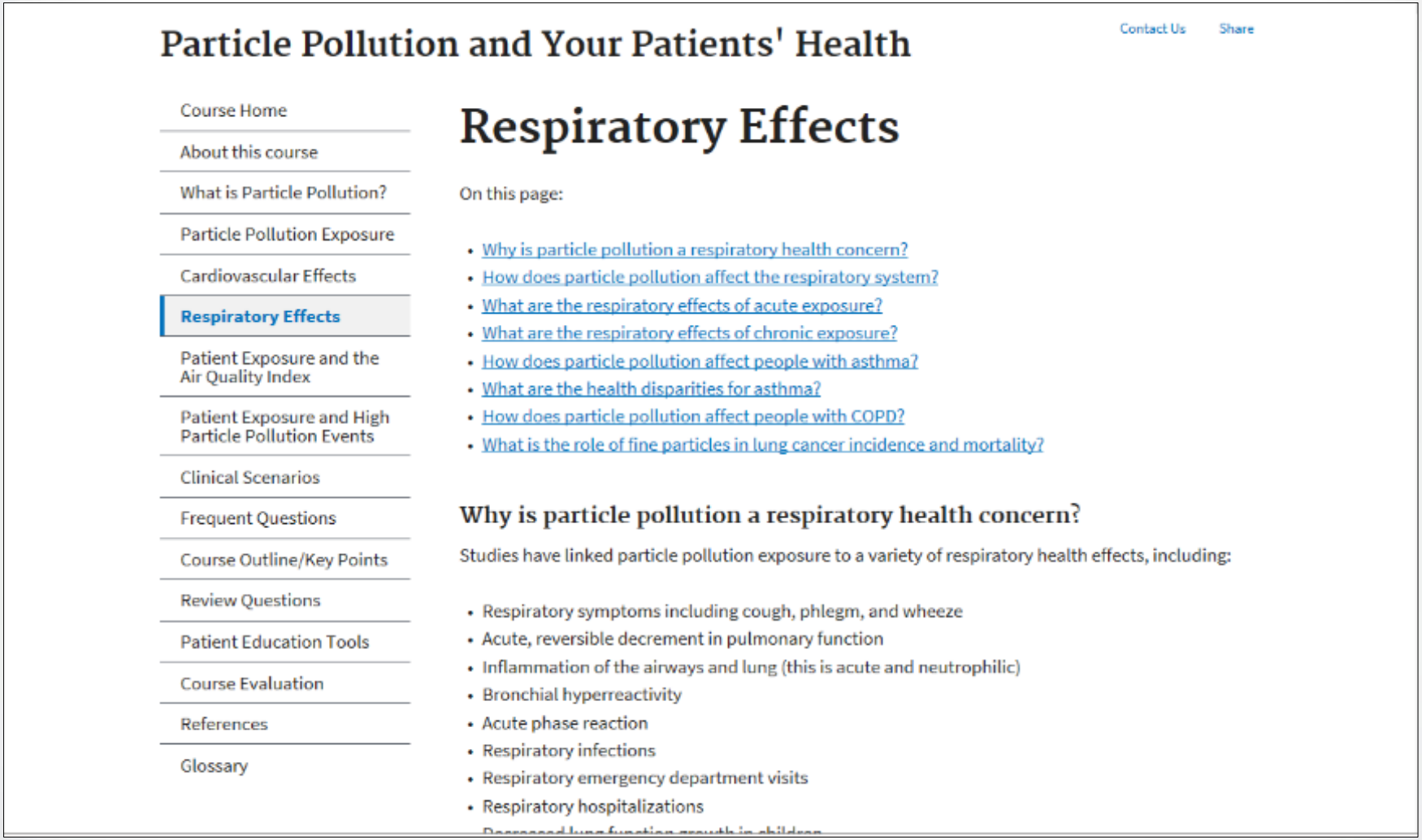


Bit.ly/epahealthyheart
https://airnow.gov/index.cfm?action=aqibasics.particle

Respiratory Effects



Particle Pollution and Your Patients' Health

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Respiratory Effects

On this page:

- Why is particle pollution a respiratory health concern?
- How does particle pollution affect the respiratory system?
- What are the respiratory effects of acute exposure?
- What are the respiratory effects of chronic exposure?
- How does particle pollution affect people with asthma?
- What are the health disparities for asthma?
- How does particle pollution affect people with COPD?
- What is the role of fine particles in lung cancer incidence and mortality?

Why is particle pollution a respiratory health concern?

Studies have linked particle pollution exposure to a variety of respiratory health effects, including:

- Respiratory symptoms including cough, phlegm, and wheeze
- Acute, reversible decrement in pulmonary function
- Inflammation of the airways and lung (this is acute and neutrophilic)
- Bronchial hyperreactivity
- Acute phase reaction
- Respiratory infections
- Respiratory emergency department visits
- Respiratory hospitalizations

https://airnow.gov/index.cfm?action=health_providers.index

https://airnow.gov/index.cfm?action=aqibasics.particle

Patient Exposure and the AQI

Particle Pollution and Your Patients' Health

Contact Us Share

- Course Home
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- **Patient Exposure and the Air Quality Index**
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- Glossary

Patient Exposure and the Air Quality Index

On this page:

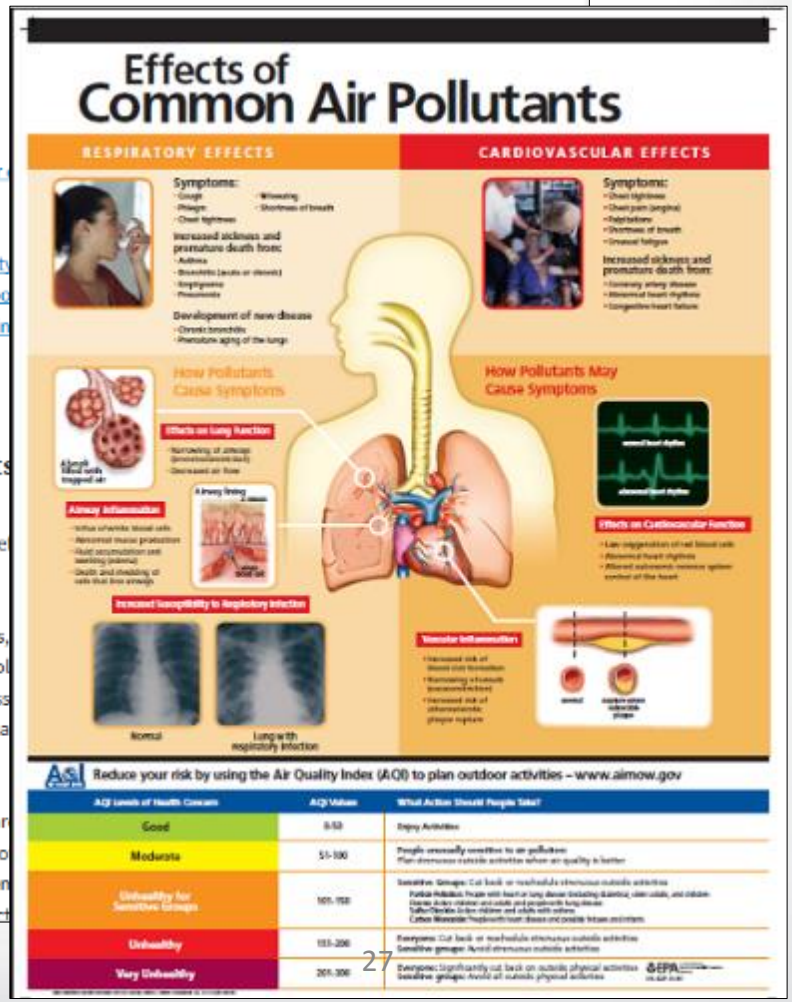
- Should I recommend that my patients reduce their
- What is the Air Quality Index (AQI)?
- Where can I find daily air quality reports?
- What can I advise my patients to do when air quality
- How can my patients reduce particle pollution expo
- How effective are air quality notifications in reducin world?
- What education materials are available?

Should I recommend that my patients particle pollution?

Yes. All people should be educated about the health e pollution and how to reduce exposure.

Your patients with heart or lung diseases, older adults, lower SES are more likely to be affected by particle pol exposure reduction measures. The American Heart Ass (Brook et al., 2010), concluded that all patients with ca about the cardiovascular risks posed by air pollution.

In your patient education, you should encourage awar weather broadcasts, on websites, or through the use o app (airnow.gov has forecasts as well as links to the en recommendations for reducing exposure by basing act



https://www3.epa.gov/airnow/health-prof/common-air-pollutants-2011-high.pdf

27

Clinical Scenarios

Balanced, evidence-based responses to these scenarios:

- Older man with hypertension, hyperlipidemia, diabetes & atherosclerotic coronary artery disease has shortness of breath and chest pain when walking
- Older woman with heart failure appears to be volume overloaded with increased central pressures
- Man with a five-year history of coronary artery disease, received a shock from his Implantable cardioverter-defibrillator (ICD) for sustained and rapid ventricular tachycardia
- Older man, complains of frequent cough with phlegm, which he has developed in the recent months
- Boy (6th grade) with asthma, has wheeze
- Woman, non-smoker who has seasonal allergy symptoms (rhinitis, conjunctivitis) that she cannot control with the over-the-counter medication

High Particle Pollution Events

Particle Pollution and Your Patients' Health

Contact Us Share

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Patient Exposure and High Particle Pollution Events

On this page:

- Introduction
- What steps can I advise for my patients who live in areas where wildfires are likely to occur?
- How can my patients use respirators to protect themselves from wildfire smoke?

Introduction

Ozone and the other common pollutants
year, in many parts of the country, partic
ranges of the AQI. These events are usua
wildfires, but on a smaller spatial and te
other types of fires or combustion. Exam
wood burning in valleys during winter-ti
for reducing exposure to particle pollutic
particles are wildfires, other fires, transp
needed with some fires depending on ha

Portions of the text in the following secti
for Public Health Officials (May 2016)," w
for smoke events, to take measures to pr
with the public about wildfire smoke and
assistance and expertise of a number of
Control and Prevention, National Institu
Protection Agency, Lawrence Berkeley National Laboratory, Forest Service, Pediatric Environmental Health Specialty Units, and the California Air Resources Board and Department of Public Health.

Consistent with Wildfire Smoke: Guide for Public Health Officials

Ozone Pollution Events

Does not offer CME at this time

https://www.epa.gov/ozone-pollution-and-your-patients-health/ozone-and-your-patients-health-about-course

Cardiovascular Disease & Asthma

Factsheets Now Available in Spanish

Asthma

EPA

ASTHMA AND OUTDOOR AIR POLLUTION

1 Air pollution can make asthma symptoms worse and trigger attacks.

If you or your child has asthma, have you ever noticed symptoms get worse when the air is polluted? Air pollution can make it harder to breathe. It can also cause other symptoms, like coughing, wheezing, chest discomfort, and a burning feeling in the lungs.

Two key air pollutants can affect asthma. One is *ozone* (found in smog). The other is *particle pollution* (found in haze, smoke, and dust). When ozone and particle pollution are in the air, adults and children with asthma are more likely to have symptoms.

2 You can take steps to help protect your health from air pollution.

► ***Get to know how sensitive you are to air pollution.***

- Notice your asthma symptoms when you are physically active. Do they happen more often when the air is more polluted? If so, you may be sensitive to air pollution.
- Also notice any asthma symptoms that begin up to a day *after* you have been outdoors in polluted air. Air pollution can make you more sensitive to asthma triggers, like mold and dust mites. If you are more sensitive than usual to indoor asthma triggers, it could be due to air pollution outdoors.

► ***Know when and where air pollution may be bad.***

- *Ozone* is often worst on hot summer days, especially in the afternoons and early evenings.
- *Particle pollution* can be bad any time of year, even in winter. It can be especially bad when the weather is calm, allowing air pollution to build up. Particle levels can also be high:
  - Near busy roads, during rush hour, and around factories.
  - When there is smoke in the air from wood stoves, fireplaces, or burning vegetation.

www3.epa.gov/airnow/asthma-flyer.pdf (English)
www3.epa.gov/airnow/health-prof/EPA-poster-Spanish-2008.pdf (Spanish)

Cardiovascular Disease

EPA Agencia de Protección Ambiental de Estados Unidos

AMERICAN COLLEGE of CARDIOLOGY

American Heart Association | American Stroke Association
life is why

Enfermedades del corazón, ataques cerebrales y contaminación del aire

1 ¿Sabía que la contaminación del aire puede provocar ataques al corazón, ataques cerebrales y otros problemas de salud?

Según estudios médicos, la contaminación del aire puede provocar ataques al corazón, ataques (derrames) cerebrales y arritmia, sobre todo en personas que están en situación de riesgo de padecer estas afecciones. Además, en las personas con una afección llamada insuficiencia cardíaca, la contaminación del aire puede reducir aún más la capacidad del corazón de bombear la sangre de la forma que necesita hacerlo. Las partículas muy pequeñas son los contaminantes más preocupantes que provocan estos efectos. La contaminación por partículas se encuentra en la neblina, el humo y el polvo, y a veces en el aire que parece limpio. Esta hoja informativa le explica cómo puede:

- Conseguir información actualizada sobre la calidad local del aire
- Proteger su salud cuando la contaminación por partículas se encuentra en niveles insalubres

2 ¿Tiene usted un riesgo más elevado?

Los adultos mayores y las personas con factores de riesgo de padecer enfermedades del corazón o un ataque cerebral pueden tener un riesgo más elevado. Tiene un riesgo mayor si:

- Ha sufrido un ataque al corazón, angina de pecho, bypass coronario (derivación vascular), angioplastia con o sin estent, obstrucciones en las arterias del cuello o de las piernas, insuficiencia cardíaca, arritmia, diabetes o enfermedad pulmonar obstructiva crónica.

Puede tener mayor riesgo de padecer enfermedades del corazón o ataques cerebrales (y, por lo tanto, ser más susceptible a la contaminación por partículas) si le corresponden cualquiera de estas condiciones:

- Es hombre de 45 años o más, o mujer de 55 años o más.
- En su historial familiar existen ataques cerebrales o enfermedades del corazón tempranas (en padre o hermano antes de cumplir 55 años; en madre o hermana antes de cumplir 65 años).

- Padece de presión arterial alta o colesterol alto.
- Tiene sobrepeso o no está físicamente activo.
- Fuma cigarrillos.

3 ¿Cómo puede proteger su salud?

Hacer ejercicio con regularidad es importante para tener buena salud, sobre todo si padece de enfermedades del corazón. Ajustar cuándo y dónde hace ejercicio le permitirá llevar un estilo de vida más saludable y reducir su riesgo de padecer problemas del corazón o ataques cerebrales provocados por la contaminación del aire. Además:

- Si padece de enfermedades del corazón o ha sufrido un ataque cerebral, consulte con su proveedor de atención médica sobre las mejores formas de proteger su salud cuando la calidad del aire es insalubre.
- Hable con su proveedor de atención médica si corre el riesgo de padecer de enfermedades del corazón o un ataque cerebral y planea hacer más ejercicio físico del habitual.

► **Sepa dónde y cuándo los niveles de contaminación por partículas pueden ser insalubres.**

Los niveles de contaminación por partículas pueden ser elevados en cualquier época de año. También pueden ser elevados:

- Cerca de vías muy transitadas, en zonas urbanas (sobre todo en horas pico) y en zonas industriales.
- Cuando hay humo en el aire proveniente de cocinas de leña, chimeneas, quema de vegetación o incendios forestales.

www3.epa.gov/airnow/heartflyer.pdf (English)
www3.epa.gov/airnow/heartflyer-sp.pdf (Spanish)

EPA Wildland Fire Research
New Web Page

Featuring:

- **Links to Public Health Information**
- **Research Areas**
- **Research Publications and Other Resources**
- **Wildland Fire Sensor Challenge**
- **Smoke Sense Study and app**

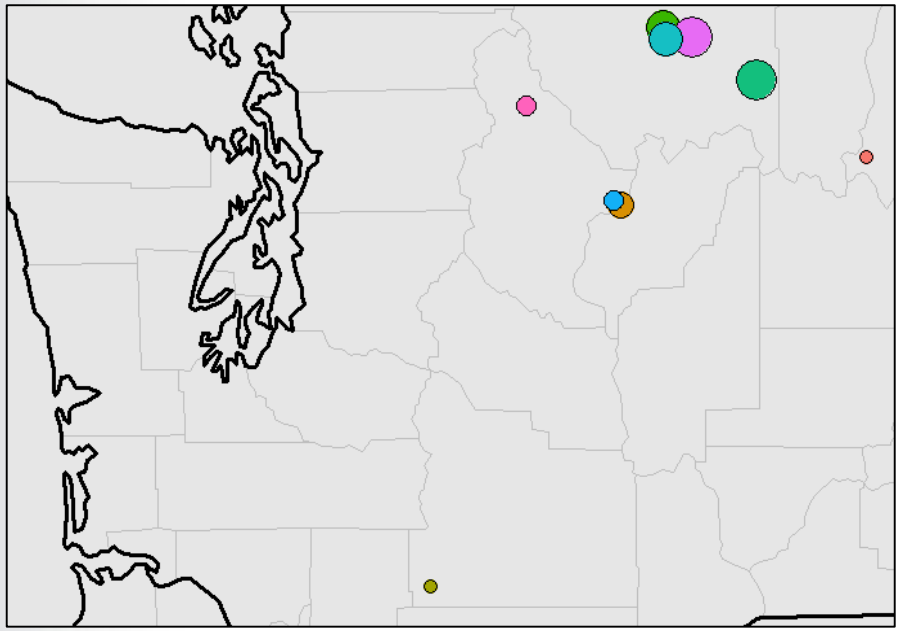
https://www.epa.gov/air-research/wildland-fire-research-protect-health-and-environment

Wildland Fire Smoke Risk Communication

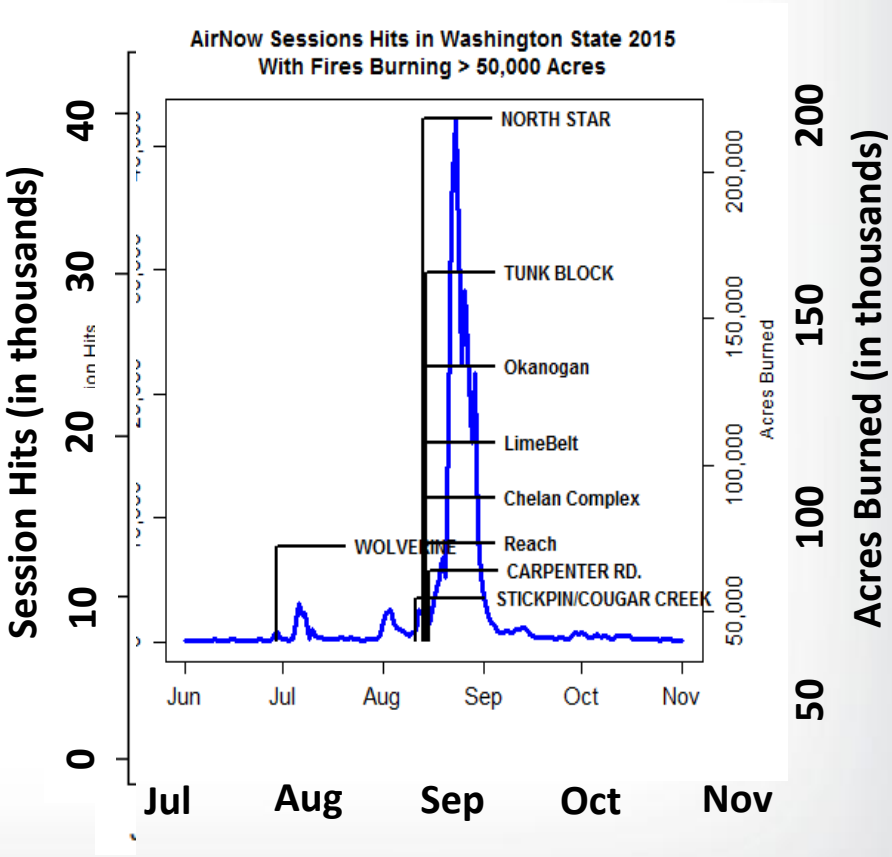
Wildfire Smoke Information

Public Interest in AirNow

Locations for Fires > 50,000 Acres Washington State for 2015



AirNow Sessions Hits in Washington State 2015 With Fires Burning >50,000 Acres



Courtesy of: Ana Rappold NHEERL/ORD/US EPA

Public Health Messaging Effectiveness
Systematic Review of the Literature

Main finding were:

- Smoke-related public health messages are communicated via a variety of channels
- Limited evidence for their effectiveness
- Recall, understanding and compliance are facilitated by messages using simple language
- Compliance differs by socio-demographics
- At-risk groups may be advised to stay indoors before the general population, in order to protect the at-risk populations

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Review

Effectiveness of public health messaging and communication channels during smoke events: A rapid systematic review

Jennifer A. Fish [a, *], Micah D.J. Peters [b], Imogen Ramsey [a], Greg Sharplin [c], Nadia Corsini [c], Marion Eckert [a]

[a] School of Nursing and Midwifery, The University of South Australia, GPO Box 2471, Adelaide, South Australia 5001, Australia
[b] The Joanna Briggs Institute, Faculty of Health Sciences, The University of Adelaide, Lvl 3, 55 King William Rd (Norwich House), North Adelaide, South Australia 5006, Australia
[c] Behavioural Research and Evaluation Unit, Cancer Council SA, 202 Greenhill Rd, Eastwood, South Australia 5063, Australia

Conclusions:

"Experimental research, as well as evaluations, are required to examine the effectiveness of modern communication channels, channels to reach at-risk groups, and the "stay indoors" message."

Fish JA, et al. J Environ Management 2017

Smoke Sense Project
Improving Public Health Outcomes

Aims of Smoke Sense:

- ***Measure the effect of wildfire smoke exposure on health and productivity***
- ***Develop health risk communication strategies to improve public health outcomes***

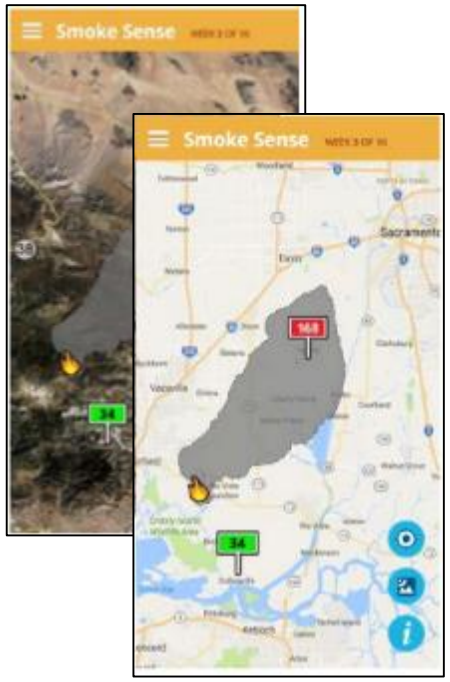
As part of this, researchers have developed a Smoke Sense mobile phone application to:

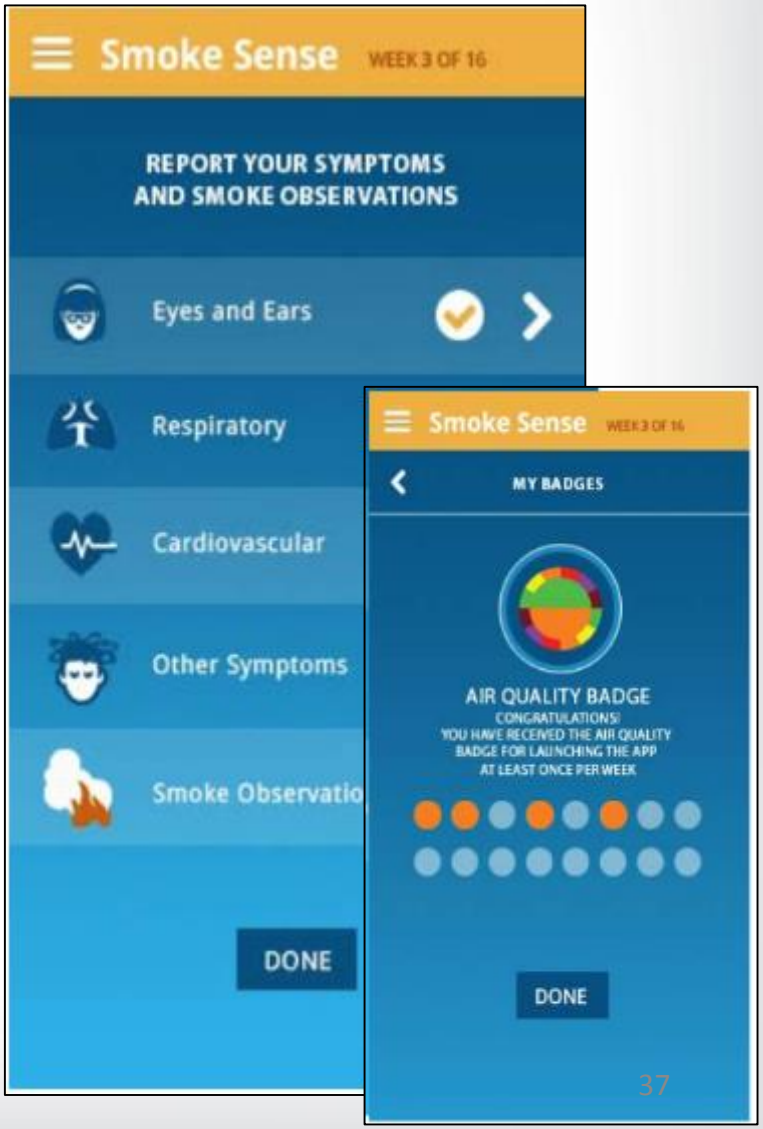
1) Collect user input on how smoke events impact their health and daily activities

2) Provide information about the smoke exposure and recommended health risk messages

Smoke Sense Project

Improving Public Health Outcomes





Wildland Fire Sensor Challenge

Multiple Federal Agency Sponsors

- Intended to stimulate development of low-cost, light-weight, accurate & easily deployable sensor technology that could be used by first responders and public health agencies during wildland fires
- Collaborative project between ORD, OAQPS, Regional offices, federal partners (USFS, NASA, NOAA, CDC, NPS) and NGOs
- Announced in early 2017, 9 month development window, testing and judging in 2018
- Designing complimentary projects with EPA Regional offices and other interested groups to field test sensors in a wildland fire scenario

For More Information Visit

WILDFIRE GUIDE - A GUIDE FOR PUBLIC HEALTH OFFICIALS, UPDATED May 2016

https://www3.epa.gov/airnow/wildfire_may2016.pdf

- AirNow
  - Current Conditions
  - Health Providers Page
  - Wildfire Smoke and Health
  - Wildfire Smoke: Guide for Public Health Officials
  - Wildfire Trends
- EPA Wildfire Research Webpage
- California Air Resources Board Resources
- CDC Wildfire Factsheets
- Wildland Fire Air Quality Response Program

Thank you

Wayne E. Cascio, MD, FACC, FAHA
Environmental Public Health Division
ORD/National Health Environmental Effects Laboratory
U.S. Environmental Protection Agency
cascio.wayne@epa.gov